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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/682,007	07/09/2001	LeRoy David Dickson	07032001	2688

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[REDACTED] EXAMINER

CHANG, AUDREY Y

[REDACTED] ART UNIT [REDACTED] PAPER NUMBER

2872

DATE MAILED: 12/10/2001

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/682,007	DICKSON, LEROY DAVID
	Examiner	Art Unit
	Audrey Y. Chang	2872

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on _____.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-8 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All
 - b) Some *
 - c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
 - a) The translation of the foreign language provisional application has been received.
- 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)
3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____	6) <input type="checkbox"/> Other: _____

DETAILED ACTION***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. **Claims 1-4 and 5-8 are rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling.** “Grating structure” is critical or essential to the practice of the invention, but not included in the claim(s) is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976). Claims 1 and 5 recite a “diffractive optical device” but fail to disclose any structure that allows diffraction phenomenon to occur. The device as recited in claims 1 and 5 therefore cannot be designated as “diffractive optical device”. Claims 2-4 and 6-8 inherit the rejection from their respective based claim.

3. **Claims 2, 4, 6 and 8 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.**
The specification fails to teach adequately how are these “anti-reflection coatings” “modified” so that S-polarization **diffraction efficiency** is decreased.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. **Claims 1-4 and 5-8 are rejected as failing to define the invention in the manner required by 35 U.S.C. 112, second paragraph.**

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The claim(s) are **narrative in form** and *replete with indefinite and functional or operational language*. The structure which goes to make up the device must be clearly and positively specified. The structure must be organized and correlated in such a manner as to present a complete operative device. The claim(s) must be in one sentence form only. Note the format of the claims in the patent(s) cited.

6. Claims 1-4 and 5-8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The phrase “material and geometric parameters … of said effective thickness” recited in claim 1 and the phrase “the material and geometric parameters … said P-polarization diffraction with wavelength is substantially minimized” recited in claim 5 are **confusing, narrative, in error and indefinite**. These make the scopes of the claims extremely confusing and unclear.

The various terms such as “the material”, “the angle of incident”, “the angle of diffraction”, “the diffracted beam”, “refractive index modulation”, “the effective thickness” and “the average bulk refractive index” recited in claims 1 and 5 are indefinite since they each lacks a proper antecedent basis.

The phrase “a volume phase grating as defined in claim 1 (or 3, or 5, or 7) recited in claims 2-4 and 6-8 are indefinite since there is no “volume phase grating defined in any of the claims (1, 3, 5, or 7).

The scopes of the claims 2, 4, 6, and 8 are unclear since it is not clear how do the **modification of the anti-reflection coatings and the decreases of the S-polarization diffraction efficiency relate to the feature concerning the diffraction efficiency of the S-polarization and the P-polarization being equal**, as recited in their respective based claims.

The term “substantially” used through out all of the claims is vague and indefinite since it is not clear to **what degree** in each of the cases should the term “substantially” be interpreted.

Clarifications are required. Claims as stand now contains numerous errors, confusions and indefiniteness. The examiner can only pointed out a few. **It is applicant's responsibility to clarify all the discrepancies in the claims to make the claims in comply with the requirements of 35 USC 112.**

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. **Claims 1-4 and 5-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Jannson et al (PN. 5,026,131) in view of the patent issued to Kato et al (PN. 5,726,782).**

Jannson et al teaches a *holographic grating* that is comprised of *Bragg volume grating* with a plurality of *Bragg planes* periodically arranged within a *recording medium* serves as the *phase medium*, (please see Figures 10a to 10k and columns 8-10). The plurality of Bragg planes is formed by periodically modulating the refractive index of the medium. Jannson et al teaches that the volume holographic grating has the advantage of having low sensitivity to polarization such that the TE and TM polarization components (or known in the art as P and S polarization components) of incident light to the grating have the *same diffraction efficiency*, (please see column 11, lines 34-44). The Bragg volume grating is known in the art as a phase grating since the plurality of Bragg planes modulates the phase of the incident light beam.

This reference has met all the limitations of the claims with the exception that it does not teach explicitly that the volume holographic grating has a transparent support and cover means. However it is

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quite well known in the art to place the recording medium of the holographic grating on top a transparent substrate and to place a cover plate on top the recording medium for protecting it from the environment, as demonstrated by the teachings of Kato et al. Kato et al teaches a hologram element that is comprised of a *photosensitive layer* (1a) serves as the *recording medium* that is placed on a *transparent base plate* (2) serves as *the transparent support means*. Kato et al teaches that a *cover plate* (4) serves as the *transparent cover means* is then placed on top of the photosensitive layer for protecting the layer, (please see Figure 1 and column 5). Kato et al also teaches that a transparent sealing layer (7b) including adhesive is provided between the cover plate and the base plate to provide a sealant and protectant for the photosensitive recording layer, (please see column 5, lines 55-60). Kato et al further teaches that an anti-reflective film (5) is provided at the exterior surface of the base plate, (please see Figure 10), for reducing unwanted reflection at the interface of the air and the base plate. The reflection occurs at the interface of the air and optical medium (such as glass base plate) is known in the art as Fresnel reflection losses, (please see Jansson et al column 1 lines 60-65). It would then have been obvious to one skilled in the art to apply the teachings of Kato et al to modify the volume holographic gating of Jansson et al accordingly for the benefit to protect the grating medium and to reduce the unwanted noises from the environment to enter the volume holographic grating. Although these references do not teach explicitly to also have the exterior surface of the cover plate coated with an anti-reflective film however such modification would have been obvious to one skilled in the art for the benefit of reducing unwanted reflected light at the interface of the cover plate with the air.

With regard to claims 3 and 7, Kato et al teaches an arrangement having a reflecting film placed at exterior surface of a convex lens, serving as the cover plate, (26 of Figure 5, or 538 of Figure 15) such that the light passes through the hologram grating is reflected back into the holographic grating. It would then have been obvious to one skilled in the art to apply the teachings of Kato et al to modify the volume

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holographic grating of Jannson et al accordingly for the benefit of providing different geometric arrangement for the holographic grating for different applications.

With regard to claims 2, 4, 6, and 8, the scopes of claims are not definitely defined for the reasons stated above. The specification also fails to teach how are the anti-reflection coatings "modified" to affect the diffraction efficiency of the S-polarization component of the light. Such features therefore cannot be fully addressed here. With regard to the minimization of the maximum difference between the diffraction efficiency of the S- and P- polarization light components, Jannson et al teaches that the volume holographic grating has same diffraction efficiency for S- and P- polarization light which minimizes the difference to zero.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US patent issued to Albert et al (PN. 6,256,435) discloses a polarization insensitive Bragg grating. US patent issued to Okumura et al (PN. 6,280, 848) discloses an antireflection coating that has different reflectance for the S- and P- polarization light.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 703-305-6208. The examiner can normally be reached on Monday-Friday (8:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cassandra Spyrou can be reached on 703-308-1637. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

*Audrey Y. Chang
Primary Examiner
Art Unit 2872*

A. Chang, Ph.D.
December 5, 2001

